



# THE CHAMBERS OF THE EYE AND RELATED STRUCTURES

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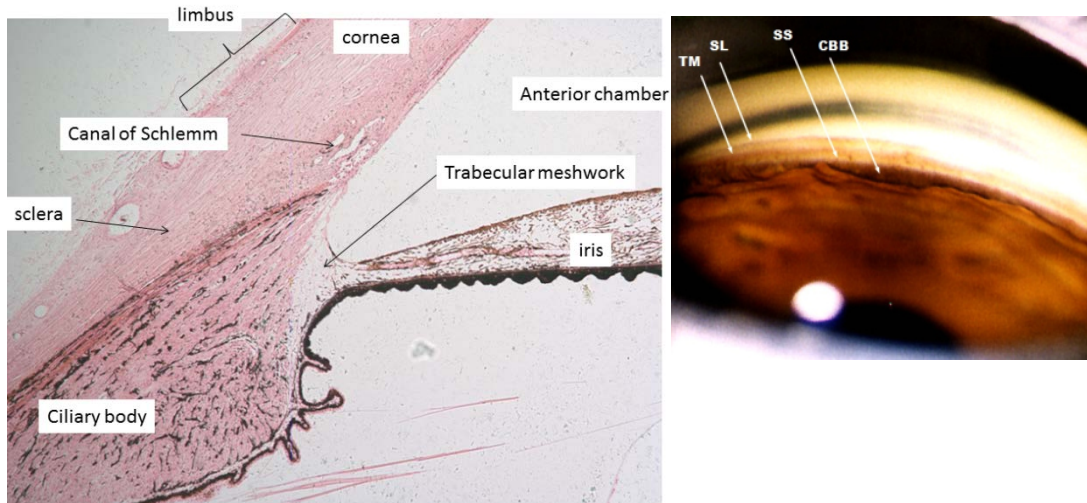
## INTRODUCTION

There are two main chambers within the eye, the anterior chamber and posterior chamber. As shown in Figure 3.1, the anterior chamber is located between the cornea and iris, with the trabecular meshwork forming its peripheral border. The anterior chamber contains aqueous humour and its principal drainage point, the anterior chamber angle.

## THE ANTERIOR CHAMBER ANGLE

The anterior chamber angle is the main exit route for aqueous humour. The main filtration apparatus through which aqueous humour passes is the trabecular meshwork. The trabecular meshwork consists of flattened perforated sheets of collagen and elastic fibres that extend from the scleral spur anteriorly across the angle to the root of the iris. As aqueous humour is drained from the anterior chamber, it passes through different parts of the trabecular meshwork. The corneo-scleral meshwork is the first part of the meshwork, and is formed by sheets of collagen with perforations. Aqueous humour then passes through the more rope-like uveal meshwork, before it passes through the Canal of Schlemm and from here into the episcleral veins. The meshwork is covered by endothelium that is continuous with the corneal endothelium. Descemet's membrane ends at the anterior chamber angle, creating a landmark called Schwalbe's line that is often visible when examining the anterior chamber angle with a gonioscope.

Gonioscopy is the procedure used to visualize the structures of the anterior chamber angle. In order to be able to assess the width of the peripheral angle it is important to be able to recognize the structures on a gonioscopic view. If one imagines standing in the middle of the iris looking into the trabecular meshwork, with the cornea located above your head, the structures that you would see in a wide open angle would be Schwalbe's line, the scleral spur, trabecular meshwork, ciliary body and lastly the root of the iris (figure 3.1).



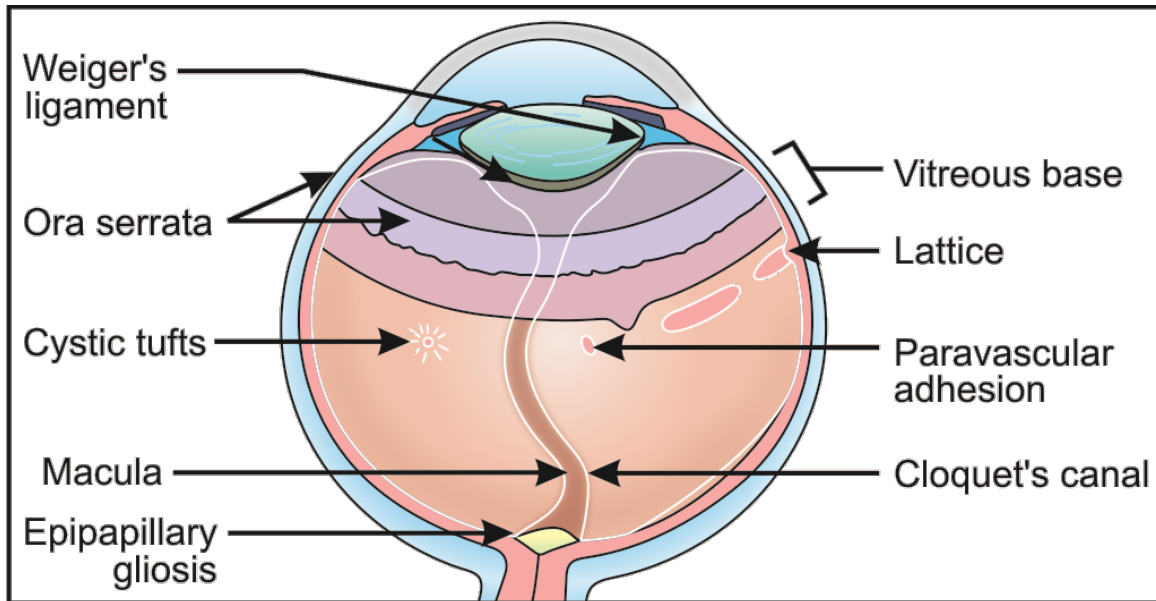
**Figure 3.1:** (A) cross section of limbus showing the anterior chamber angle; (B) a gonioscopic view of the angle, showing Schwalbes line (SL), the trabecular meshwork(TM), scleral spur (SS), and ciliary body (CBB)

## THE POSTERIOR CHAMBER AND VITREOUS BODY

The posterior chamber is located posterior to the iris and principally contains the vitreous body. The vitreous humour is colourless, transparent and gelatinous in appearance and has a volume of approximately 4ml in total. While acting as an important component of the ocular media, its viscoelastic properties help maintain the shock-absorbing properties of the eyeball. The vitreous humour is acellular with molecular constituents mainly comprising hyaluronic acid and type 2 collagen fibrils. It contains a higher percentage of water (99%) than any other body tissue.

The vitreous forms several attachments to surrounding structures. The strongest of these is the vitreous base, where the vitreous attaches to the ora serrata. Other attachments occur to the posterior lens, optic nerve head and retinal blood vessels. The vitreous is adherent to the lens, and also to the posterior zonules, in form of a 9mm annular ring called *Wieger's ligament*. Wieger's ligament marks the border of the anterior hyaloid membrane and *Cloquet's canal*. Posteriorly, the *vitreopapillary adhesion* around the optic disc marks the junction of the posterior hyaloid membrane and posterior limit of Cloquet's canal. Detachment at this point leads to the appearance of a *Weiss ring*.

The vitreous can be divided into different zones that differ in density. The outermost zone is the vitreous cortex, or hyaloid membrane. It is composed of tightly packed collagen fibrils that run mostly parallel with the retinal surface. The vitreous is in contact with the retina but only slightly adherent to it at the retinal *internal limiting membrane* by means of gel fibrils. The intermediate zone is located inner to the vitreous cortex and contains fibres that run antero-posteriorly. The most inner or central zone is Cloquet's canal. It has an S shape and runs from the optic disc surface through the vitreous to the posterior surface of the lens. The hyaloid canal contains remnants of the 'primitive vitreous'. Failure of the hyaloid artery to completely disintegrate during gestation can result in *hyaloid remnants*, most commonly observed at posterior lens or optic disc surface.



**Figure 2:** The vitreous humour showing areas of strongest attachment and Cloquet's canal